

**ABSTRACT OF THE DISCLOSURE**

A digital performance monitoring method and system for an optical communications system utilizes a channel monitor and a digital signal processor (DSP). The channel monitor is designed to monitor a respective channel signal of the optical communications system, and includes a sample memory for storing sample data including a set of sequential N-bit (where  $N > 1$ ) samples generated by an Analog-to-Digital (A/D) converter at a predetermined sample rate. The digital signal processor (DSP) is designed to calculate at least one performance parameter of the optical communications system based on the stored sample data. The sample rate of the A/D converter is at least equal to a baud rate of the channel, and preferably satisfies the Nyquist criterion. Multiple A/D converters may be used parallel to sample respective orthogonal components of the channel signal. In this case, the stored sample data may be representative of the complex E-field of the channel signal.